

**REMARKS**

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1, 5 and 17 have been amended herein. Claim 5 has been amended to correct a minor typographical error. Claim 17 has been amended to depend from claim 15. Claim 1 has been amended to recite that the process is for preparing a composite of nanocrystalline structure. Support for the amendments to claim 1 can be found throughout the specification as filed, specifically at page 10, lines 2-5 and page 7, lines 11-13.

Claims 1-14 were subject to a restriction requirement. The specification has been objected to for some minor informalities. Claims 1-12 and 14-17 stand rejected as allegedly being unpatentable under 35 U.S.C. § 112, first and second paragraphs. Claims 11 and 17 are objected to for failing to further limit the claim from which they depend. Claims 1-6, 8-12 and 14 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Ovshinsky et al. (U.S. Patent No. 5,554,456) or Bogdanovic (U.S. Patent No. 5,162,108). Claims 7 and 15-17 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Ovshinsky et al. ("Ovshinsky") or Bogdanovic further in view of Hong (U.S. Patent No. 5,552,246). Applicants respectfully traverse these rejections for the reasons set forth below.

**The Restriction Requirement**

The Examiner has maintained the restriction of claim 13 from elected claims 1-12 and 14-17. Applicants respectfully request that the Examiner reconsider his holding and examine claim 13 together with claims 1-12 and 14-17.

Contrary to the Examiner's assessment, the process claims recite the preparation of a nanocomposite according to claim 13 and the properties of the compound recited in this claim are obtained by the process of claims 1 to 12 and 14-17. The Examiner mentioned that the "process as claimed can be used to make other and materially different products such as RE (Mn,Al)<sub>2</sub> alloys." First, the RE (Mn,Al)<sub>2</sub> alloys proposed by the Examiner are not Mg based alloys as required in claim 1. Second, even if the process as presently recited in claim 1 would be applied to prepare RE (Mn,Al)<sub>2</sub> alloys, then the end product would be an

amorphous material and not a composite of nanocrystalline structure as described in step (c) of claim 1. Therefore, the process as stated in claims 1 to 12 and 14-17 can only lead to the nanocomposites of claim 13. Withdrawal of the restriction is respectfully requested.

**Objection to the Oath/Declaration**

The Examiner has required a new declaration since the address of three inventors on page 4 of the declaration had been corrected in the original declaration. While applicants believe that the declaration is proper, applicants request that the PTO's request be held in abeyance as applicants are currently executing a corrected declaration and will forward it to the PTO in due course.

**The Rejection Under 35 U.S.C. § 112, First Paragraph Should Be Withdrawn**

Claims 1-12 and 14-17 stand rejected as allegedly being unpatentable under 35 U.S.C. § 112, first paragraph for use of the claim term that the "said other element(s) or compound(s) or their hydride(s) is not  $\text{Mg}_2\text{NiH}_4$ ." For the reasons set forth herein, the rejection is without merit and should be withdrawn.

It is settled that there is nothing inherently ambiguous or uncertain about a negative limitation, so long as the boundaries of the patent protection sought are set forth definitely, albeit negatively. For example, a claim which recited the limitation "said homopolymer being free from the proteins, soaps, resins, and sugars present in natural Hevea rubber" in order to exclude the characteristics of the prior art product, was considered definite because each recited limitation was definite. *In re Wakefield*, 164 USPQ 636, 638, 641 (CCPA 1970). In addition, the negative limitation "incapable of forming a dye with said oxidized developing agent" was held to be definite because the boundaries of the patent protection sought were clear. *In re Barr*, 170 USPQ 330 (CCPA 1971).

If alternative elements are positively recited in the specification, they may be explicitly excluded in the claims. See *In re Johnson*, 194 USPQ 187, 196 (CCPA 1977) ("[the] specification, having described the whole, necessarily described the part remaining."). The proper legal standard for written description analysis is "whether applicants had

possession of the claimed invention when the application was originally filed.” See *Ex Parte Parks*, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993). The  $\text{Mg}_2\text{NiH}_4$  compound was positively recited in the specification, see, *e.g.*, page 15, lines 25-28, and, as such, may be explicitly excluded in the claims. In contrast to the Examiner’s suggestion, the specification does not require  $\text{Mg}_2\text{NiH}_4$  as an essential element. Accordingly, applicants’ proviso language has support in the originally filed application and, therefore, withdrawal of this ground for rejection is respectfully requested.

### **Claims 11 and 17 Are Proper**

Claims 11 and 17 are objected to in the Office Action for failing to further limit claims 10 and 16 from which they depend. As a first matter, applicants submit that claim 11 depends from claim 9 and not claim 10 as set forth in the Office Action. For at least this reason, this objection should be withdrawn. While claim 17 is proper as drafted, solely in an effort to further prosecution of the above-captioned application applicants have amended claim 17 to depend from claim 15. Accordingly, this objection should be withdrawn.

### **The Rejection Under 35 U.S.C. § 103**

Claims 1-6, 8-12 and 14 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Ovshinsky or Bogdanovic. Claims 7 and 15-17 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Ovshinsky or Bogdanovic further in view of Hong. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. See MPEP §2143.03. As set forth herein, neither Ovshinsky, Bogdanovic nor Hong, alone or in combination, disclose or suggest the instantly claimed invention.

Claim 1 has been amended herein to recite a process for preparing a “composite of nanocrystalline structure.” The claim has further been amended to recite that the hydride that is obtained from the process has an average crystal size lower than 100 nanomicons.

Both Ovshinsky and Bogdanovic teach the use of “gentle” mixing or “mild ball milling” (*i.e.* low energy ball milling) to produce the hydrogen storage materials. In that

sense, the references relied upon by the Examiner actually teach away from using high energy ball milling because otherwise, the distinct nature of the components would be destroyed (see *e.g.*, Ovshinsky - column 13, lines 11-15: "these procedures cannot be continued for such a period of time that the separate and distinct nature of the at least two hydrogen storage materials is destroyed").

Bogdanovic discloses a method for preparing a hydrogen storage material comprising an active or doped Mg, which material is not nanocrystalline. This method according to Bogdanovic basically consists of contacting a finely divided powder of magnesium hydride or metallic magnesium with a finely divided powder of a transition metal which acts as a catalyst. Mixing is preferably carried out in an aqueous solution (see the abstract).

The materials of Bogdanovic require a high temperature for operation. For example, Bogdanovic states that "the magnesium or magnesium hydride powder so doped is also extremely active in absorbing and desorbing hydrogen, *e.g.* picking up or giving off 6.5 to 7.65% its weight of hydrogen at about 250°C-400°C" (see column 4, lines 28 to 32). At this temperature (for example 267°C in Table I of Bogdanovic), the typical time for hydrogenation is of a few hours. In comparison, the compounds according to the present invention absorb hydrogen in high quantity at the room temperature in a few minutes while at temperature of about 267°C, the absorption is made in a few seconds instead of a few hours (see figure 10 of the present application). There is nothing in Hong to overcome the deficiency in Bogdanovic. As such, Bogdanovic, either alone or in combination, does not disclose or suggest the method set forth in claim 1. Since claims 2-12 and 14-17 depend from claim 1, for at least this reason these claims are patentable over Bogdanovic.

Ovshinsky discloses a heterogeneous composite which is not a nanocomposite. See, *e.g.* the specific reference is made to a "microlevel" difference in claim 2. This heterogeneous composite comprises at least two separate and distinct hydrogen storage alloys blended together, for use in the electrochemical field. Each component of the composite can be prepared by a multitude of different methods including rapid solidification (column 12, lines 36 to 38) laser ablation (see column 13, lines 23 and 24) or conventional melt-hydride grinding process (see column 12, lines 32 to 35). The latter method is well known. It

consists in first preparing an ingot of alloys (for example Mg-Ni), then melting and subsequently hydrogenating this ingot to make it fragile and finally processing it and breaking it to convert it into a powder. The resulting powder is a fine polycrystalline powder of conventional size, not a nanocrystalline powder like those obtained and prepared by the “intensive mechanical grinding” of the claimed invention. There is nothing in Hong to overcome the deficiency in Ovshinsky. As such Ovshinsky, either alone or in combination, does not disclose or suggest the method set forth in claim 1. Since claims 2-12 and 14-17 depend from claim 1, for at least this reason these claims are patentable over Ovshinsky.

Applicants have amended the claims herein to address the Examiner’s Response to Arguments as set forth on page 7 of the Office Action which alleges that “the instant specification as originally filed does not disclose the size of the claim composite”. Contrary to the Examiner’s contention, the word “nano” is not just a use that could be used for measuring any side of composite. As such, it is respectfully submitted that the rejections should be withdrawn.

### **Conclusion**

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

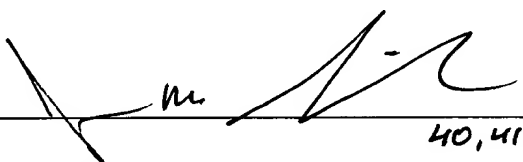
The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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